Trajectory Features of the New 9M723 Iskander-M Missiles

When launching ballistic (aeroballistic) missiles of the 9M723 type of the Iskander-M complex, different types of flight trajectories can be observed. Most often, these are ordinary classic trajectories, but starting in August 2020, evidence began to appear that the trajectories of Iskander-M missile launches, for example, of the "model 9M723 model 2016" type, may be somewhat unusual.

Missile type 9M723, 2016 version (video footage from Youtube).

It is quite possible that the latest modifications of the 9M723 missiles use more advanced missile control systems that can provide a wide range of trajectory options for different missile use scenarios - from classic ballistic (No. 1 in the figure below) to flat (No. 3) and high steep trajectories for short-range firing (No. 2). This short note is an attempt to explain the use of one or another trajectory option.

Launch trajectory of 9M723 missiles of the Iskander-M complex, video of the Russian Ministry of Defense, 05.08.2020

Author: DIMMI Created: 27.03.2023 22:25:24 Comments: 0 READ THE FULL ARTICLE

MIOM 15M69 / 15M69M

DATA AS OF 2023 (standard replenishment)
Unit 15M69 MIOM
Unit 15M69M MIOM-M
★★★

Engineering support and camouflage vehicle (MIOM) of the engineering units of the Strategic Missile Forces. The unit was developed and is produced by the Titan Central Design Bureau (Volgograd). It performs its tasks as part of the Yars or Topol-M PGRK, as well as independently. MIOM 15M69 was accepted into service and has been supplied to the Strategic Missile Forces since 2009. By July 2012, the engineering units of the Teikovo missile formation were fully equipped with such units. In the future, MIOMs will be supplied to the Irkutsk and Novosibirsk missile formations of the Strategic Missile Forces.

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According to the report on the website of the Russian Ministry of Defense, in December 2012, successful State tests of the modernized MIOM-M vehicle were conducted at the 1st State Test Site of the Russian Ministry of Defense (Plesetsk Cosmodrome). The MIOM was modernized in several areas — both the units of the unit itself (gearbox, electrical installation) and the simulation tools used — inflatable mock-ups for various purposes will be used on the vehicle. The first samples of MIOM-M vehicles were delivered to the Teikovo Missile Force in January-February 2013.

One of the first photos in the media of MIOM 15M69, published in April 2011 (http://pressa-rvsn.livejournal.com).

Author: DIMMI Created: 08.10.2012 13:34:38 Comments: 3 READ THE FULL ARTICLE

ASBU Signal (1st generation ASBU)

DATA AS OF 2023 (standard replenishment)
ASBU "Signal" (1st generation ASBU)
★★★

Combat control system of the Strategic Missile Forces of the 1st generation. The lead developer of the system is NII-101 GKRE under the Council of Ministers of the USSR, the chief designer is V.Ya. Kravets (since May 1963 - V.S. Semenikhin) . Due to the increased requirements for the ACS "Signal", the development of its equipment was assigned on a competitive basis to the OKB of the Leningrad Polytechnic Institute (LPI, later - NPO "Impulse", chief designer T.N. Sokolov).

Historical background :
The first missile units were controlled by the Commander and Staff of Artillery of the Soviet Army (1946-1955). With the strengthening of the role of missile technology in 1955, the Headquarters of Rocket Units was created, which was subordinate to the Deputy Minister of Defense of the USSR for special weapons and rocket technology. By 1959, the Headquarters of Rocket Units had accumulated experience in controlling missile units and with the formation of the Strategic Missile Forces (SMF) in 1960, the prerequisites for the creation of a control system were formed, which included control bodies and points at the strategic, operational and tactical levels, automated control systems and communication systems. The main control body of the SMF became the Main Staff of the SMF. Typical technologies of that time were used to transmit control commands - telephone, telegraph, teletype. In August 1960, under the leadership of the Chief of the General Staff of the Missile Forces, Colonel General M.A. Nikolsky conducted an exercise with one of the missile divisions, which showed the need for urgent development and implementation of automated control means, especially in the link of the central command post of the missile forces - the regiment. On January 15, 1960, the 6th department (automation of troop control) was created in the Operational Directorate of the General Staff of the Strategic Missile Forces, consisting of 5 officers and 2 employees. Colonel M.Z. Kuzmin was appointed head of the department.

Statement of the task of developing an automated control system :
In 1961, the Operational Directorate of the General Staff of the RV, together with the Research Institute-4 of the Ministry of Defense, developed the principles of constructing a system for the automated transmission of orders for constant combat readiness and the collection of reports with their visual display. In early 1962, the Research Institute-4 of the Ministry of Defense manufactured experimental samples of the main control links, which were tested in the troops. In the same year, the first tactical and technical requirements for the development of the Signal system were developed and issued to the industry, approved by the Commander-in-Chief of the Missile Forces, Marshal of the Soviet Union S.S. Biryuzov. An active role in this work belonged to the head of the 6th automation department, Colonel M.Z. Kuzmin, and the department officer, Captain A.S. Dubovitsky. Based on the tests of experimental samples of the equipment, on September 29, 1962, the CPSU Central Committee and the USSR Council of Ministers adopted a Resolution on the development of an automated control system for the Strategic Missile Forces (code "Signal"). The lead developer of the system equipment was determined to be the Research Institute-101 of the State Commission for Radio Electronics and Electronics of the USSR Council of Ministers, and V. Ya. Kravets was appointed chief designer of the system (since May 1963 - V. S. Semenikhin, Research Institute-101) . Research Institute-4 of the Ministry of Defense became the lead contractor for the development of the communication system for the Signal automated control system and documents on its combat use. To supervise the development and manufacture of the system equipment, a department of automated control systems was created within the Main Directorate of Military-Engineering Defense (head of department, engineer-colonel A. N. Sapozhnikov). The co-contractor for the development of information-logical devices (ILU) for the ACS control links on a competitive basis was the LPI Design Bureau (chief designer of the ILU and deputy chief designer of the ASBU - T. N. Sokolov).

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Remote control panels of the Strategic Missile Forces combat control system "Signal-A" (source)

Author: DIMMI Created: 22.12.2022 13:02:58 Comments: 1 READ THE FULL ARTICLE

A-135 system, A-925/51T6 missile - ABM-4 GORGON

DATA AS OF 2023 (standard replenishment)
A-135 Amur-P / 5Zh60P missile defense system, A-925 / 51T6 / 5V51 missile - ABM-4 GORGON / SH-11
A-135 / RTC-181 / Amur / 5Zh60 missile defense system, A-925 / 51T6 / 5V51 missile - ABM-4 GORGON
★★★★

Multi-channel missile defense system of the Central Industrial District / Moscow - development of the A-35 missile defense complex . The development of a modernized version of the A-35 missile defense system - the A-35M system - was conducted by NIO-4 OKB-30 under the leadership of G.V. Kisunko until his dismissal in 1975. In parallel with Kisunko, work on the preliminary justification for the creation of a new second-generation missile defense system was begun by a group of the USSR Ministry of Radio Industry under the leadership of A.G. Basistov on the instructions of Minister V.D. Kalmykov at the end of 1968. By the end of 1969, the concept of a two-tier missile defense system was generally agreed upon with the USSR Ministry of Defense. It was assumed that anti-missiles with nuclear warheads would be used. In 1970, the ABM theme was completely transferred under the control of the USSR Ministry of Radio Industry - on January 17, 1970, the specialized TsNPO Vympel (ABM, missile attack warning systems and space control) was formed, the head of the scientific and technical center of TsNPO Vympel was A.G. Basistov. The development of the system in the NTC TsNPO Vympel was carried out on the topic of the research work "Fon-1".

Resolution of the USSR Council of Ministers No. 376-119 on the creation of the A-135 ABM system with the long-range interception firing complex "Amur" and the test site prototype "Amur-P" was issued on June 10, 1971. The A-135 system project was developed by TsNPO Vympel in 1971 under the supervision of A.G. Basistov. The project envisaged the creation of three Amur firing complexes at a distance of 600-800 km from Moscow and three S-225 short-range interception complexes , which would minimize the damage from the use of nuclear-tipped anti-missiles in the long-range ABM echelon and increase the reliability of intercepting attacking warheads. In December 1971, the preliminary design of the A-135 system (Research Institute of Radio Instrument-Making - NIIRP - USSR Ministry of Radio Industry) and the preliminary design of the Amur firing complex (STC TsNPO Vympel, chief designer - A.G. Basistov) were completed. The development of the A-925/51T6 anti-missile was entrusted to the Fakel Design Bureau, chief designer - P.D. Grushin. O.V. Golubev was deputy chief designer of the A-135 ABM system for the anti-missile guidance system.

Monument with an electric weighing model of the A-925/51T6 missile, Sofrino-1 settlement near Moscow, 12/28/2011 (Dmitry, http://da-ck9.livejournal.com).

Author: DIMMI Created: 28.03.2010 16:15:48 Comments: 164 READ THE FULL ARTICLE

S-225 Azov system, 5Ya27/V-825 missile - ABM-X-3B

DATA AS OF 2023 (standard replenishment)
S-225 system, Azov complex, 5Ya27 / V-825 missile - ABM-X-3B
★★★

Exoatmospheric interception anti-missile missile as part of the Azov object-based anti-missile defense complex of the S-225 ABM system. By Resolution of the Council of Ministers of the USSR No. 660-270 of June 29, 1962 and Resolution No. 499-174 of May 4, 1963, the creation of the S-225 anti-aircraft guided weapon system was entrusted to KB-1 of the Ministry of Radio Industry and OKB-2 of the USSR Ministry of Aviation Industry. The development of an updated ABM system project was started by KB-1 in June 1962 under the supervision of T.R. Brakhman and K.K. Kapustyan.

The S-225 complex was proposed as an alternative to the developments of OKB-30 (A-35 - ABM-1 GALOSH). It was decided to replace the missile with a solid-fuel ramjet engine with a faster two-stage solid-fuel missile V-758. The design of the V-758 missile was started in 1964 by OKB-2 (MKB "Fakel"), general designer P.D. Grushin.

In 1965, SB-32 KB-1 released a new preliminary design for the S-225 system with two interception echelons and new missiles - a middle echelon with the V-825 missile and a close echelon with the V-758 missile. This project for the first time envisaged the use of a medium-range interception missile with a liquid-propellant rocket engine at the second stage - the V-825, the development of which was carried out by OKB-2 P.D. Grushin, the leading designer - V.A. Fedolov (since March 4, 1969 - V.E. Sloboda).

According to the preliminary design of 1965, the S-225 system was intended to defend border and coastal facilities from a limited strike by ballistic missiles. It was considered advisable to build a system from a group of single-channel fire complexes, united by common control and receiving external target designation. Relatively short interception ranges of ballistic missiles made it possible to use radars with a relatively moderate potential and missiles with a limited mass. All this made it possible to create the S-225 system as a complex of transportable assets. The ability to intercept a ballistic target in the atmosphere made it possible to select a warhead from among false targets (*source: Anti-aircraft missile system*).

The design of the 5Ya27 (customer index) / V-825 (designer index) missile began in 1964. The preliminary design of the missile was completed by July 1964. In November 1965, the preliminary design of the anti-missile system was adjusted to accommodate the new preliminary design of the S-225 system with two interception levels - medium (5Ya27 missile) and short (5Ya26). The S-225 system was renamed anti-missile and anti-aircraft, and the 5Ya27 / V-825 missiles were supposed to hit both aerodynamic and ballistic targets.

The missile design was significantly changed. After that, the development of technical documentation began. The production of the first missile samples for testing was carried out by the pilot production of the MKB "Fakel". The development of serial production of the missile began at the Dolgoprudny Machine-Building Plant in 1969. Serial production continued until 1973, about 20 missiles were produced.

Special thanks to "vuv" (http://militaryrussia.ru/forum/) and other veterans of the S-225 tests for their help in working on this material.

Anti-missile 5Ya27 MKB "Fakel" of the S-225 complex (Korovina V., Missiles "Fakel". Moscow, MKB "Fakel", 2003)

Author: DIMMI Created: 05.03.2023 21:38:00 Comments: 1 READ THE FULL ARTICLE

9K72 / R-17 - SS-1C/D/E SCUD-B/C/D - status, export, sources

DATA FOR 2023 (standard update)
9K72 / R-17 - SS-1C/D/E SCUD-B/C/D
9K72 / R-17 - SS-1C/D/E SCUD-B/C/D - Complex infrastructure, projections
★★★★★

Hwasong-5 missile on a 9P117M SCUD-B type SPU at a parade in Pyongyang, April 15, 2012 (photo from the Boaz Guttman archive, http://www.flickr.com

Author: DIMMI Created: 20.04.2009 19:43:08 Comments: 55 READ THE FULL ARTICLE

UR-200 / 8K81, UR-200A / 8K83 - SS-X-10 SCRAG

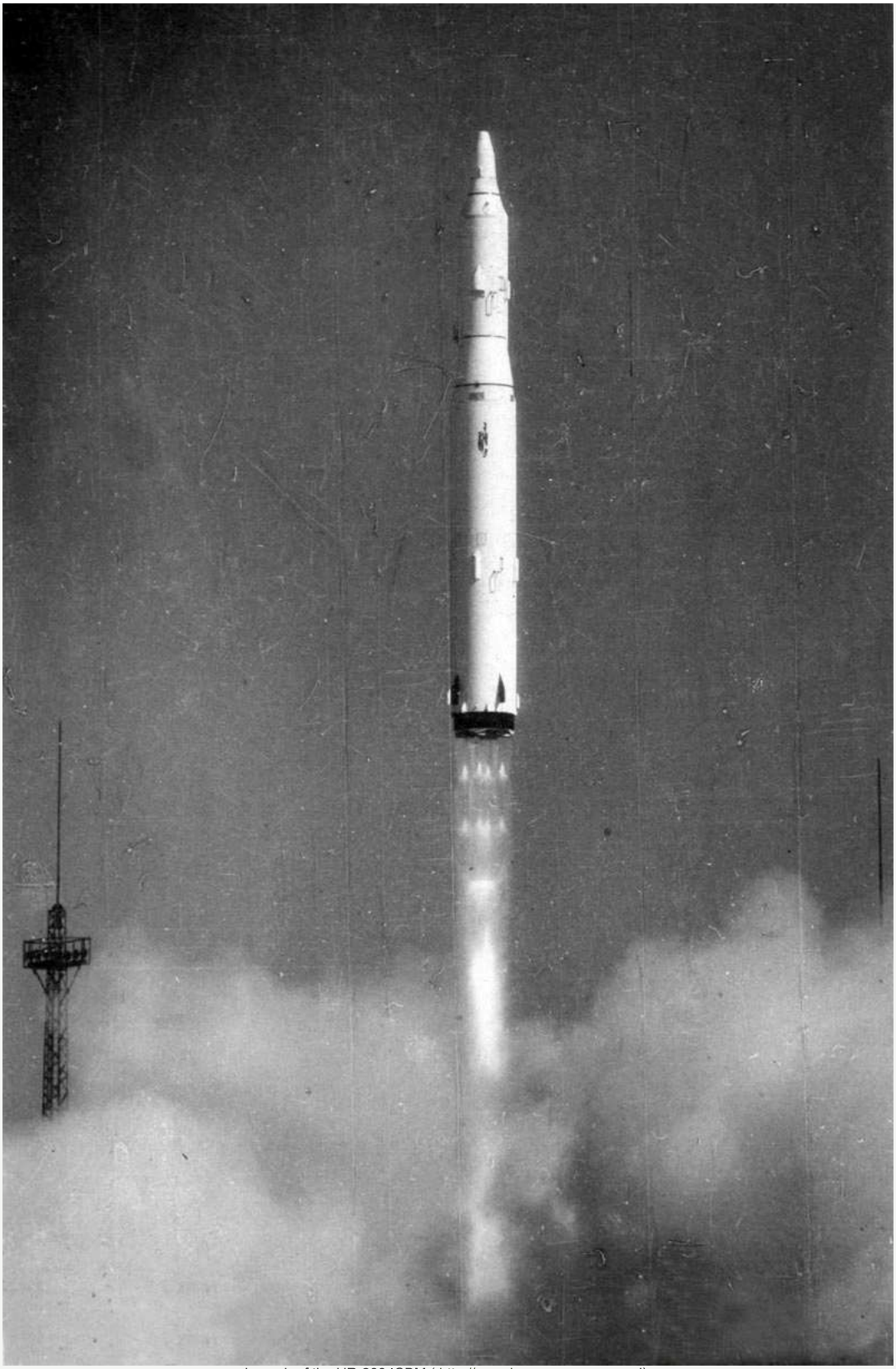
DATA AS OF 2023 (standard replenishment)
R-200 / UR-200 / 8K81 - SS-X-10 SCRAG
Missile UR-200A / 8K83 Missile
★★★★

Intercontinental ballistic missile (ICBM) / universal missile - second series. Development of the missile was started by OKB-52 of General Designer V.N. Chelomey in 1960. Development of the missile was carried out at Branch No. 1 of OKB-52 (now KB "Salyut" of FSUE GKNPTs im.V. Khrunichev), established on October 3, 1960 on the basis of the closed OKB-23 of aircraft designer V. Myasishchev (head of the branch - V. Bugaisky). The official start of the development was given in the Resolution of the Council of Ministers of the USSR No. 258-110 of March 16, 1961 and in the Resolution No. 689-288 of August 1, 1961 (probably on the creation of a system with the anti-satellite spacecraft "IS"). Initially, the missile was called R-200 (source) and was developed as an ICBM and a launch vehicle for spacecraft (in particular, the anti-satellite system "IS"). In May 1961, a preliminary design of the missile was ready. In October 1961, working drawings for the 8K81 launch vehicle were developed (source). The preliminary design of the missile was released in May 1962.

Later, by Resolution of the USSR Council of Ministers No. 243-117 of March 2, 1962, development of a version of the UR-200 was assigned - the UR-200A global orbital missile with two types of warheads - a non-maneuvering ballistic missile and a two-plane maneuvering aeroballistic missile. By Resolution of the USSR Council of Ministers of April 16, 1962 No. 346-160 "On the most important developments in intercontinental ballistic and global missiles and spacecraft carriers" a decision was made to concentrate the efforts and resources of the design bureau, research institutes and industry on the creation, among other models of missile technology, of "the universal UR-200 missile in the version of an intercontinental missile with a ballistic trajectory for transporting a special charge ... and a global version for delivering a special charge to a target ... with the start of flight tests - the fourth quarter of 1963."

In accordance with the aforementioned Decrees, the UR-200 missile was created in the following versions:
- UR-200 - a launch vehicle and an intercontinental ballistic missile;
- UR-200A - an orbital intercontinental (global) missile with a non-maneuvering or maneuvering in the atmosphere warhead. The following versions were also under development as a further development of the UR-200 missile:
- UR-200B - a universal missile with increased energy compared to the UR-200;
- UR-200V - a version of the UR-200 for placement in a silo launcher;
- UR-200UV - a version of the UR-200 for placement in a silo launcher with increased protection.

As a launch vehicle, the UR-200 was supposed to be used to launch into orbit anti-space defense systems (IS spacecraft with a launch mass of up to 1,600 kg into an orbit of 250-300 km) and global maritime reconnaissance satellites (US spacecraft with a launch mass of up to 2,500 kg into an elliptical orbit with an apogee of 264 km). As an ICBM, it was required to ensure the delivery of ballistic unguided warheads to a range of 12,000 (warhead mass up to 2,500 kg) and 14,000 km (warhead mass up to 2,000 kg) with an accuracy of no worse than ±4 km in range and ±3 km in lateral deviation. As a global missile, it was required to ensure the launch of the AB-200 maneuvering aeroballistic warhead into a reference orbit at an altitude of about 150 km.



Launch of the UR-200 ICBM (http://www.buran.ru , processed).

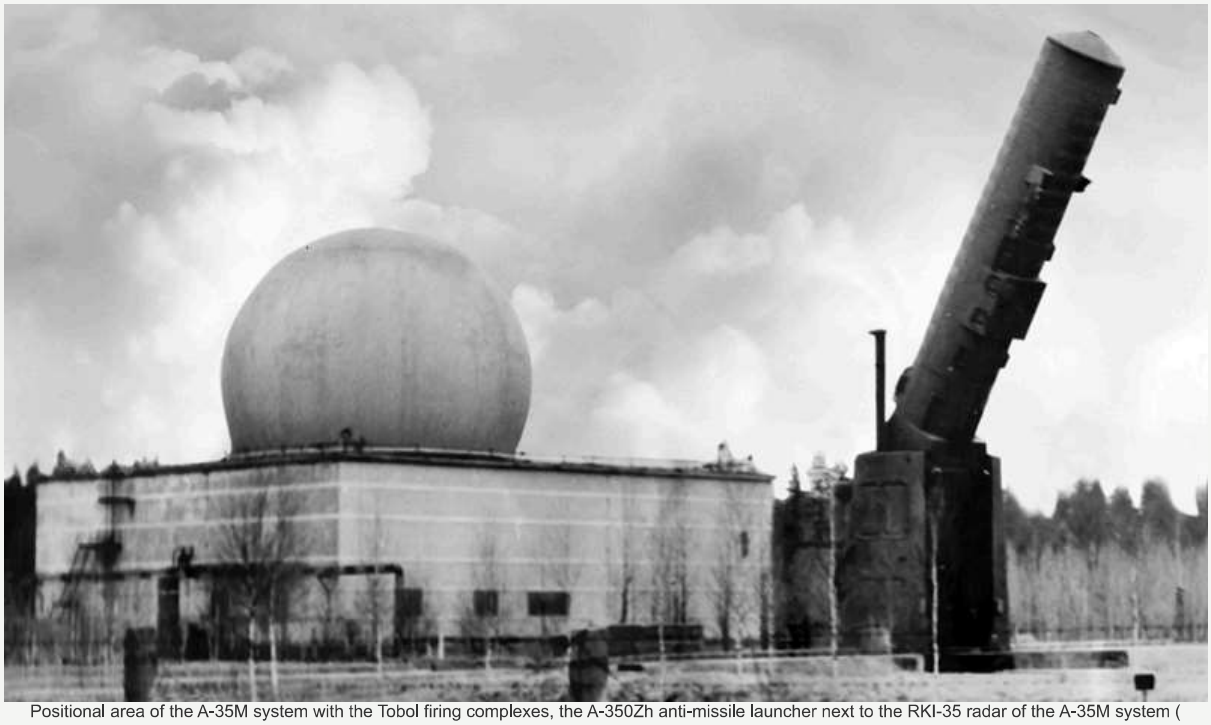
Author: DIMMI Created: 29.01.2013 22:59:32 Comments: 17 READ THE FULL ARTICLE

A-35M System - ABM-1B GALOSH

DATA AS OF 2023 (standard replenishment)

A-35Msystem , A-350Zh / 5V61 / UR-96 missile - ABM-1A GALOSHA-35M system, A-350R / 5V61R / UR-96M missile - ABM-1 mod.2 / ABM-1B / SH-04 GALOSHABM system - a multi-channel Moscow ABM system with an exoatmospheric anti-missile - a modernization of theA-35using updated algorithms, equipment, guidance means, with the new A-350R missile. The development of the modernized ABM system was carried out since 1970 under the leadership ofG.V. Kisunko(since 1975 - I.D. Omelchenko). Deputy Chief Designer of the A-35M ABM system for the anti-missile guidance system was O.V. GolubevThe ways of further development of theA-35were worked out starting from 1968. In November (November 5 and 14, 1968) at the scientific and technical council of the USSR Ministry of Radio Industry two ways of modernization of the system were considered:1)G.V. Kisunko- strengthening the A-35 system with short-range firing complexesS-225(future53T6) with an increase in the potential and channels of the radar and CP;2) Basistov A.G. - development of a new missile defense system similar to the Safeguard system (USA).In some sources the system is classified as ABM-2 according to NATO terminology (for example, in the classification adopted by the Federation of American Scientists,http://fas.org), which we consider to be an erroneous identification.

★★★★



Positional area of the A-35M system with the Tobol firing complexes, the A-350Zh anti-missile launcher next to the RKI-35 radar of the A-35M system (http://vpk-news.ru).

Author: DIMMI Created: 29.03.2010 01:38:50 Comments: 65 READ THE FULL ARTICLE

15P011 / 15A11 Perimeter

DATA AS OF 2022 (in progress)
15P011 Complex, 15A11 Missile
★★★

Command missile of the 15E601 Perimeter system. The complex and missile are used to convey the order of the strategic forces command to units and formations on the use of forces and assets during a nuclear missile attack, when conveying orders by conventional means becomes difficult or impossible. The development of a special command missile for the corresponding Perimeter command complex was assigned to the Yuzhnoye Design Bureau by Resolution of the USSR Council of Ministers No. 695-227 dated August 30, 1974. The lead designer of the missile is V.V. Koshik. The basic missile was initially supposed to be the MR-UR100 / 15A15 ICBM , but later the more advanced MR-UR100UTTH / 15A16 missile was used .

The preliminary design was developed in December 1975. The new part of the ICBM was the special warhead 15B99, which contained a radio-technical system developed by the LPI Design Bureau. To perform its functions, the warhead had to have a constant orientation in space during flight. Accordingly, a system for stabilizing the position of the warhead in space was developed using a compressed air propulsion system as a working element. The experience of work on the 15F678 Mayak controlled warhead, which was developed for the R-36M ICBM, was used . This significantly reduced the cost and time frame for creating the command warhead. Production of the special 15B99 warheads was organized at NPO Strela in Orenburg, from where the SGCh were delivered directly to the testing ground and later to the Strategic Missile Forces units.

The following enterprises took part in the development of the complex with the command missile:
- KB Yuzhnoye - the lead company for the missile and for the 15V99 special warhead
- NPO Impuls (former OKB LPI, V.I. Melnik) - equipment for the special warhead 15B99
- NPO AP (N.A. Pilyugin) - the missile control system
- KBSM (A.F. Utkin) - launch equipment
- TsKBTM (B.R. Aksyutin) - arsenal equipment
- MNIIS (A.P. Bilenko)
- VNIIS (B.Ya. Osipov)
- TsKB Geofizika (G.F. Ignatyev)
- NII-4 MO (E.B. Volkov)

ICBM MR-UR-100/15A15 in the TPK, Baikonur test site, 2015 (https://myauu.livejournal.com/)

Author: DIMMI Created: 21.12.2022 09:44:54 Comments: 1 READ THE FULL ARTICLE

Sarmat! How much is in this sound

"Sarmat"! How much is in this sound.

An informal look at the program for creating the 15A28 / RS-28 Sarmat heavy liquid intercontinental missile and, at the same time, a few thoughts on the potential of the new ICBM.

So, on the Strategic Missile Forces Day (12/17/2022), we have the following results for the program for creating the new 15A28 Sarmat intercontinental liquid-propellant missile:
- the first and so far the only launch of an ICBM within the framework of flight design tests (FDT) was successfully completed on 04/20/2022;
- at the same time, both at the end of November and on the occasion of the Strategic Missile Forces Day, there were statements in the media that the Sarmat's FDT were proceeding successfully;
- work is underway at the position of the first regiment in the Uzhur area to prepare the infrastructure, but their appearance on satellite images suggests that construction work is unlikely to be completed before 2023, although the silos may be ready to accept missiles for the sake of accepting missiles in December 2022 (I don't know what the point is if there is no other infrastructure).

At the same time, it is highly likely that 3-4 missiles were launched for the LKI - even if we remember how many TPKs we saw in the Krasmash workshops in various news stories. Well, at least three launches would probably be close to what can be called the "first stage of the LKI".

In general, I think that the real deployment of the new ICBM will probably begin in 2024-2025. And now there will be games around the LKI, reports and saving heads and ranks.

The first launch of flight design tests of the 15A28 Sarmat heavy liquid-propellant ICBM, 04/20/2022, Plesetsk test site.

Author: DIMMI Created: 29.11.2022 17:23:28 Comments: 0 READ THE FULL ARTICLE

OKR Mozyr / product 171 / Kamchatka PRO

DATA AS OF 2022 (standard replenishment)
R&D "Mozyr" / product "171" / "Kamchatka PRO "
★★★★

Active protection system for silo launchers of ICBMs of the Strategic Missile Forces. The development of an active protection system for ICBM silo launchers from attacks by warheads of ballistic missiles (including ICBMs) was carried out by the Machine-Building Design Bureau (Kolomna) under the general supervision of S.P. Nepobedimy since the mid-1970s. The chief designer of the KAZ is N.I. Gushchin. In 1979, the KBM department that was engaged in the creation of the KAZ product "171" was headed by V.M. Kashin (he headed the department in 1979 to 1985). The creation of the complex was directly supervised by the USSR Minister of Defense D.F. Ustinov and it is believed that the complex was created to protect future silos of the R-36M2 Voevoda ICBM . The Tikhomirov Institute of Instrument-making (A.A. Rastov, V.V. Matyashev) and the NPO Fazotron (V.K. Grishin) took part in the development of the complexes.

The active protection complex (APC) of the silo was to operate using the principles laid down in the APC of armored vehicles: an attacking object was detected as it approached the defended object and a barrier of fragments and combat elements fired by a multi-barrel APC

was created in its path. Although the creation of the infrastructure for testing the complex began in 1980-1981, the Resolution of the USSR Council of Ministers on the development and testing in real conditions at the Kura proving ground of the experimental complex was issued only in 1984. 250 enterprises of 22 ministries were involved in the creation of the system. Probably, in the second half of the 1980s - early 1990s, a prototype of the ICBM silo launcher APS was tested at the Kura test site on the Kamchatka Peninsula (military unit 25522, Klyuchi-1) at a special site 20 kilometers north of the Shiveluch volcano (object DIP-1).

To conduct tests at the Kura test site, probably between 1985 and 1988, an imitation of an OS-type ICBM silo launcher was built and a prototype of the active protection system was placed around the silo. During tests in the late 1980s, a low-altitude non-nuclear interception of an ICBM warhead simulator launched from the Plesetsk test site (according to other sources, from Baikonur) was carried out for the first time. Also, some later sources report that several such interceptions were carried out (*source - Gundarov*). The sources also mention electronic launches of the APS on warheads arriving at the Kura test site.

State tests of the experimental installation, Product "171", were completed in September 1991 (*source: Gundarov*). Funding for the work was stopped in August 1991. This development did not contradict the 1972 ABM Treaty. In 2012, information appeared in the media about the possible resumption of work on developing the APS for ICBM silos.

The data on the Mozyr APS are largely unconfirmed and probabilistically hypothetical. Many conclusions on the functioning of the APS are made by assumption.The name "product 171" is mentioned by some later sources (source - Gundarov).

Schematic diagram of the active protection system for the ICBM silo, product "171" / R&D "Mozyr" (http://militaryrussia.ru).

Author: DIMMI Created: 11/15/2011 00:51:28 Comments: 259 READ THE FULL ARTICLE

RS-26 Rubezh / Avangard - KY-26 / SS-X-31 complex

DATA AS OF 2019 (standard replenishment)
RS-26 Rubezh / Avangard / Avangard-R / Avangard-Rubezh complex, 15Zh67 - KY-26 / SS-X-31 missile
★★★

Strategic missile system with an intercontinental ballistic missile of increased firing accuracy / with a small-sized ICBM. The complex is being developed by the Moscow Institute of Thermal Engineering (MIT), the chief designer is probably Yu.S. Solomonov . The development of the complex within the framework of the Avangard program for the Rubezh R&D began no later than 2006. In the period from 2006 to 2009, research on the Rubezh topic was conducted by national research universities. In 2008, the Minsk Wheel Tractor Plant delivered a set of documentation (technical design) to MIT on the MZKT-79291 chassis in a modern version for the APU of the prospective PGRK, and MIT conducted related R&D with MZKT (source). According to an interview with Yu.S. Solomonov dated 17.03.2011, the development of the complex will be completed by 2013.

The first test launch of the complex was expected in 2011 and most likely ended in an accident on 27.09.2011. There is also a hypothesis that the first launch was a throw-in to test an autonomous launcher of a new type and was in fact quite successful. The second launch in general and the first ballistic launch took place from the Plesetsk test site from a mobile launcher on May 23, 2012. The training warhead arrived in the designated area of the Kura test site in Kamchatka. The third launch was successfully carried out from the Kapustin Yar test site on October 24, 2012, at the Sary-Shagan test site, and, probably, during this launch, the anti-missile capabilities of the new missile's warhead were assessed. The second such and the fourth launch overall was carried out on June 6, 2013. Some media outlets reported on tests of the MIRV type warhead, which may be a mistake.

According to the media, the complex is planned to be accepted into service by the end of 2013. The deployment of the first missile regiment is planned for 2014. Also, starting in 2014, the missile of the new complex will be serially produced by the Votkinsk Machine-Building Plant. On December 14, 2012, the Commander-in-Chief of the Strategic Missile Forces, Colonel General Sergei Karakayev, told the media that in the future, the new missile will replace the Topol-M and Yars ICBMs.

The name of the complex (or missile) "Avangard" was first mentioned in an interview with the Minister of Defense of Russia A. Serdyukov on July 1, 2011 in the context of a threefold increase in the supply of strategic missiles to the Strategic Missile Forces during 2011-2015. The complex differs from previous generations of complexes by significantly increased capabilities of combat control and communications (*interview with Yu. S. Solomonov on March 17, 2011, possibly referring to the "Yars-M" complex*), as well as, probably, the use of a new type of fuel in the rocket stages, accelerating the passage of the active section of the trajectory (source).

In the statementAccording to the media of the consultant of the Commander of the Strategic Missile Forces Colonel General Viktor Yesin from 21.07.2015, the missile complex with the RS-26 ICBM, also known as "Rubezh", was named "Yars-M".

The data are partly of a hypothetical nature, the conclusions are based on information from the specified open sources. According to one version, the name "Avangard" refers to the missile of the complex.

A variant of the supposed appearance of the APU of the RS-26 Rubezh missile system with the supposed type of missile - based on the RS-24 Yars missile system (MilitaryRussia.Ru , variant from 21.01.2018)

Author: DIMMI Created: 05.07.2011 22:03:35 Comments: 1282 READ THE FULL ARTICLE

15П175 Siren, rocket 15У75 - SS-25 SICKLE

DATA AS OF 2022 (standard replenishment)
15P175 Sirena complex, 15U75 / 15Zh75 missile - SS-25 SICKLE
★★★

Intercontinental ballistic missile (ICBM) of the 15E601 Perimeter-RTs command missile complex. The complex was developed by the Moscow Institute of Thermal Engineering (MIT) based on the RS-12M Topol missile complex .

The purpose of the Perimeter-RTs system: transmitting an order to use nuclear weapons to command posts of units and formations of the Strategic Missile Forces and other types of strategic nuclear forces, launchers and nuclear-powered submarines. It is envisaged that the system will be used as an alternative channel for transmitting orders in the event of a disruption of regular communications. Upon order from the relevant command, a missile is launched, which, while flying over the country's territory, transmits the corresponding code signals on the radio.

Some sources report that the system is fully automated to ensure guaranteed completion of its mission. I believe that this is fundamentally at odds with the military's attitude to decision-making automation that has developed in the USSR and Russia - a person or even a group of people must always make a decision. The USSR would not have dared to entrust such an important decision to computers.

The first version of the Perimeter system with the 15A11 command missile was accepted into service in the first half of the 1980s.

Tests of the 15Yu75 command ICBM began at Site 169 of the Plesetsk test site on August 8, 1990, and were completed by the end of 1990. A total of four ICBM launches were performed during the tests. The first and only regiment in the Strategic Missile Forces equipped with the Sirena PGRK took up combat duty in December 1990 in the 8th Missile Division of the Strategic Missile Forces (Yurya, regiment commander - Colonel S. I. Arzamastsev).

In December 2011, the Commander of the Strategic Missile Forces, Lieutenant General Sergei Karakayev, stated that the Perimeter system exists and is on combat duty (source). It is believed that from 1995 to 2005, at a minimum, the complex was not on combat duty. In 2005, missile regiments No. 76, 304 and 776, removed from combat duty, were concentrated at the 3rd site of the 8th missile division, each with 3 SPUs of the complex (source).

SPU 15U128.1 on the MAZ-7912 chassis with TPK - "Topol" complex (official photo from documents on OSV agreements, http://www.fas.org).

Author: DIMMI Created: 15.02.2019 23:29:10 Comments: 1 READ THE FULL ARTICLE

15P157 Pioneer-3, missile 15Zh57 - SS-X-28 SABER

DATA FOR 2022 (standard update)
Complex 15P157 "Pioneer-3", missile 15Zh57 - SS-20 SABER mod.3 / SS-X-28 SABER
Complex "Pioneer-4"
★★★

Mobile ground-based missile system (PGRK) with a medium-range ballistic missile (MRBM). The system and missile were developed on the basis of the 15P653 Pioneer-UTTKh system with the 15Zh53 missile, with possible unification with the PGKR ICBM Topol . The development of a modification of the Pioneer system was determined by the US plans to deploy a theater missile defense system in Europe based on the Patriot SAM system. To successfully overcome such missile defense systems, it was assumed that more advanced small-sized and light warheads with a lower radar signature would be used. At the same time, it was possible to increase the number of warheads to four. The development was carried out by the Moscow Institute of Thermal Engineering (MIT) under the general supervision of A.D. Nadiradze on the basis of the Resolution of the CPSU Central Committee and the USSR Council of Ministers dated November 12, 1979, No. 1011-289.

The development of the project showed that such a number of warheads was excessive for a medium-range missile. There was also a need to further increase the warhead deployment zone and allocate mass-energy reserves for the implementation of measures to counter the missile defense system.

Resolution of the Central Committee of the CPSU and the Council of Ministers of the USSR No. 300-120 of April 6, 1983 established a three-block equipment for the Pioneer-3 MRBM.

Cooperation of developers:
- MIT - the lead developer of the complex, development of the missile
- TsKB Titan (Volgograd) - SPU and support vehicles of the complex
- Design Bureau of the Minsk Automobile Plant (Minsk) - SPU chassis
- LNPO Soyuz (Lyubertsy) - charges of sustainer solid propellant rocket motors from composite fuel
- NPO Avtomatiki i Priborostroeniya (Moscow) - control system of the complex
- KB-1 VNIIEF - developer of combat equipment of the 15Zh53 missiles

The new missile 15Zh57 was created with a high degree of unification of the sustainer stages with the 1st and 2nd stages of the 15Zh58 ICBM PGRK Topol. The breeding stage and combat equipment were developed specifically for the new modification of the Pioneer.

SPU complex 15P157 "Pioneer-3" (http://www.russianarms.ru/ , processed).

Author: DIMMI Created: 29.05.2015 22:29:11 Comments: 4 READ THE FULL ARTICLE

Complex 9K71 Temp, missile 9M71 - SS-12 SCALEBOARD

DATA FOR 2022 (standard update)
Complex 9K71 "Temp", missile 9M71 / 9M72 - SS-12 SCALEBOARD / KY-06
★★★★

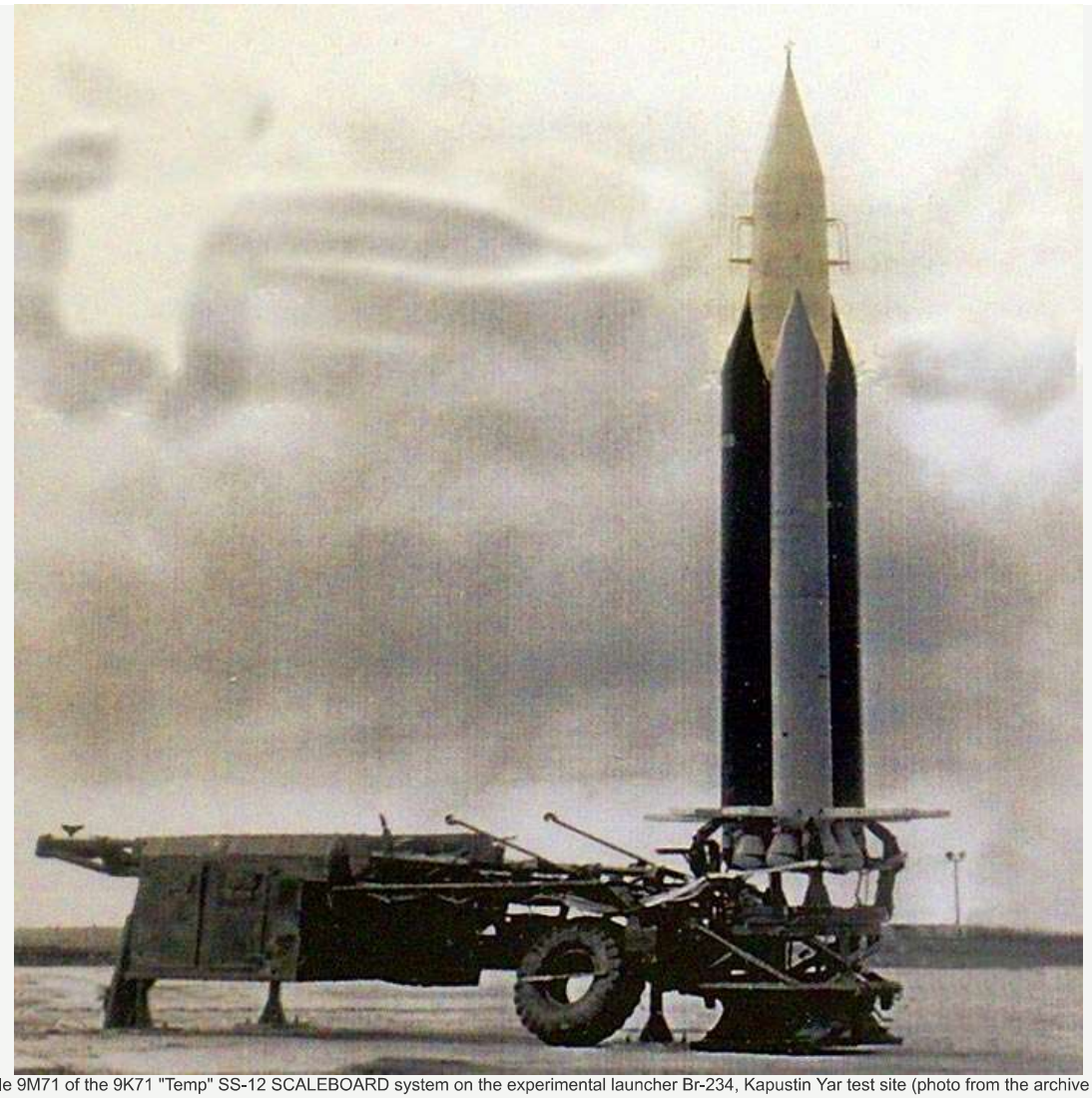
The Frontline Ballistic Missile (Operational-tactical Missile) is a solid-fuel missile created to replace the 8K14 liquid-fueled missiles with a detachable warhead containing a nuclear charge. Development of the missile was initiated by Resolution of the USSR Council of Ministers No. 839-379 of July 21, 1959. The complex and the missile were developed by NII-1 (later renamed the Moscow Institute of Thermal Engineering), chief designer A.D. Nadiradze. The ground-based launch equipment was developed by the design bureau of Plant No. 221 "Barrikady". Development of the Br-225 launcher was initiated on February 14, 1959, the draft design was ready in April 1960, and the prototype was manufactured in 1961-1962.

The missiles were manufactured at Plant No. 235 in Votkinsk.

The first stage of flight design tests (the main objective was to check the practical feasibility of creating an operational missile defense system using solid-propellant rocket motors) was conducted at the Kapustin Yar test site from April 14 to August 15, 1961, using the Br-234 test site launcher (manufactured by the Barrikady plant). The first launch of the Temp missile was on May 20, 1961. Two more launches were made as part of the first stage of testing. The second stage of testing (the main objective was to refine the system and test it for compliance with the performance specifications; 12 missiles were tested) lasted from October 1961 to July 1963. Three launches were made from the standard Br-225 launcher from January to May 1962. In the summer of 1962, the missile was modified to increase its range to 460 km and reduce warhead oscillations in free flight, which led to undershoots. Serial production of the missiles was supposed to begin in 1963. Tests of the modified Temp missile began in December 1962. Of the 12 launches, 6 missiles were destroyed on the trajectory, and the flight results of the rest did not meet the requirements for the creation of the complex, but the last 4 launches took place without incidents (*source - Veselovsky*).

The work was stopped by the decree of the USSR Council of Ministers No. 800-273 of July 16, 1963 "Due to the delay in the flight design tests and insufficiently high technical characteristics of the product."

Special thanks to users "Sluchayny" and "binladin" from the forum http://militaryrussia.ru for unique photo materials.



Missile 9M71 of the 9K71 "Temp" SS-12 SCALEBOARD system on the experimental launcher Br-234, Kapustin Yar test site (photo from the archive of the user "Sluchany", http://militaryrussia.ru/forum , published 30.06.2011).

Author: DIMMI Created: 29.03.2009 00:35:47 Comments: 42 READ THE FULL ARTICLE

9K77 Record, 9M77 missile - SS-1D SCUD-C / KY-03

DATA AS OF 2022 (standard replenishment)
Complex 9K77 "Rekord", missile R-17M / 9M77 - SS-1D SCUD-C / KY-03
★★

Project of an operational-tactical missile with an increased flight range. The development of a variant of the R-17/8K14 missile with increased fuel tanks and a flight range of 500 km was carried out on an initiative basis by OKB-235 (Votkinsk Machine-Building Plant Design Bureau) under the leadership of Evgeny Dmitrievich Rakov. The development was carried out under the code ROC "Record" in 1964-1968. Since the plant's design bureau had no experience in independent development, technical management of the project was assigned to SKB-385 (V.P. Makeyev) for the missile and to SKB-626 (N.A. Semikhatov) for the control system. The proposal to create the missile was considered by the Military-Industrial Complex under the USSR Council of Ministers and development was initiated by the Resolution of the USSR Council of Ministers of March 1963.

Flight design tests of the 9K77 missile system were conducted at the Kapustin Yar test site from April 1964 to 1967. The Chairman of the State Commission was Colonel General I. I. Volkotrubenko. The tests were not very successful, but the last four launches were successful and a total of 5 successful launches were conducted under the flight design program. According to the recollections of one of the veterans of the Kapustin Yar test site, A. N. Zakharov (source), the increased dimensions of the missile could not withstand the overloads that occurred when the missile entered the dense layers of the atmosphere, and the missile was destroyed in flight.

In connection with the creation of the operational-tactical missile on solid fuel "Temp-S" NII-1 (future MIT) with a flight range of up to 900 km, work on the R-17M complex was stopped. Later, due to disagreements with the director of plant No. 235 V.G. Sadovnikov, presumably not without the participation of A.D. Nadiradze - a competitor of the 9M77 project - the chief designer of the missile and the complex E.D. Rakov was removed from development and soon fired (*source - Karpenko*).

The missile was identified by the US Department of Defense as KY-03 based on satellite images.

Author: DIMMI Created: 24.10.2022 20:28:22 Comments: 1 READ THE FULL ARTICLE

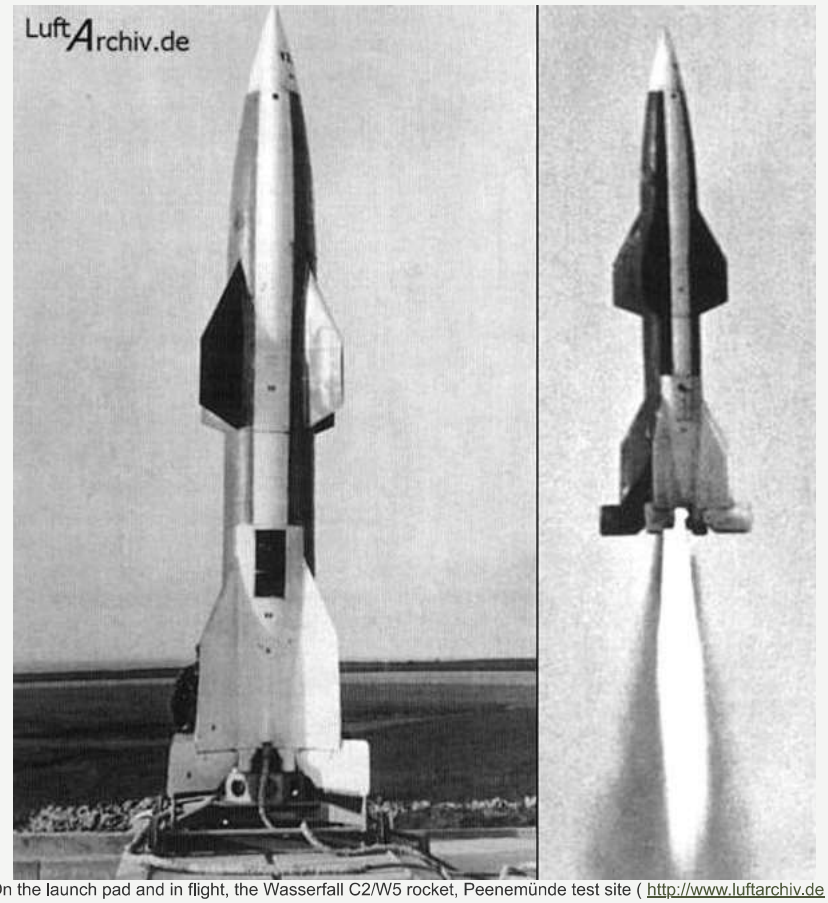
Wasserfall / P-101

DATA AS OF 2022 (standard replenishment)
Wasserfall C2 W1 / W5 / W10
R-101 / R-101B / R-102
★★★★

Surface-to-air missile / ballistic missile / Navy ballistic missile. After the end of the Great Patriotic War, on May 13, 1946, the USSR Council of Ministers adopted Resolution No. 1017-419 "Questions of Rocket Armament". This Resolution for 1946-1948 set the tasks of complete restoration of technical documentation and samples of German anti-aircraft guided missiles; restoration of laboratories and stands with all the equipment and devices necessary for conducting research and experiments on Wasserfall missiles; training of Soviet specialists who would master the design of missiles, testing methods, technology for the production of parts and components and assembly of missiles. Work on captured Wasserfall anti-aircraft missiles under the index R-101

was carried out by Department No. 4 of the Special Design Bureau of the Scientific Research Institute-88 (future OKB-1 of the Scientific Research Institute-88), chief designer - E.V. Sinilshchikov.

The Wasserfall C2 guided anti-aircraft missile was created in Germany under the general supervision of Werner von Braun using the technological achievements of the V-2 project, chief designer - Walter Dornberger. The development of the SAM concept began in 1941. The contract for the creation of the missile was concluded on November 2, 1942. At the same time, requirements for the missile were issued. It was planned to ensure the probability of hitting bomber-type targets of at least 50%. Technical design was carried out in 1943. The first (unsuccessful) launch of the missile took place on February 29, 1944. At the same time, preparations for serial production of the missile began, but serial production was never established by the end of the war, although it was planned to produce 5,000 missiles. The first modifications of the W1 and W5 missiles differ significantly in size and performance characteristics from the last modification W10. In March 1945, during tests, the missile reached an altitude of 16 km and showed a speed of 780 m/s. Data on the possible combat use of the Wasserfall SAM is most likely incorrect. Some researchers believe that no more than 50 missiles were launched in total (*source - Burgess E.*), others (*source - Book on 658 ZRP*) report that protocols of 40 experimental missile launches were discovered, of which only 14 were successful.



On the launch pad and in flight, the Wasserfall C2/W5 rocket, Peenemünde test site (http://www.luftarchiv.de).

Author: DIMMI Created: 13.01.2013 10:16:41 Comments: 10 READ THE FULL ARTICLE

T-80

DATA AS OF 2011 (standard replenishment)
T-80 / "object 219"
T-80B / "object 219R"
T-80A / "object 219A"
T-80BV / "object 219RV"
T-80U / "object 219AS"
T-80U(M) / "object 219AS"
T-80UK
T-80UM1 "Bars"
★★★

Main battle tank. Development was started by the decree of the USSR Council of Ministers dated 16 April 1968 by SKB-2 of the Kirov Plant PO (Leningrad). The initial project - "object 219sp1" - T-64 with a gas turbine engine. Tests of the experimental tanks "object 219" were conducted in 1972-1973. Experimental military operation of a battalion of experimental tanks "object 219" was carried out in 1974-1975 in the Baltic Military District. Based on the results of tests and experimental operation, it was established that a tank with a gas turbine engine has a number of advantages over tanks with diesel engines (see Engine below). The tank was accepted into service by the decree of the USSR Council of Ministers dated 06 July 1976 as the T-80 main battle tank / "object 219sp2". Serial production of the first modifications was carried out at the Kirov Plant (LKZ, Leningrad) from 1976 to 1978. Subsequently, serial production was carried out at LKZ (probably until 1992) and since 1985 at the OZTM plant (Omsk). All modifications of the tank (except for the T-80UK) were developed by SKB-2 LKZ, the T-80BK modification, T-80UK and some others were developed by the OZTM design bureau. Based on the T-80 tank, the T-80UD tank with a diesel engine was created at Kharkiv Design Bureau of Tank Machine Building (Kharkov) . Description of the modifications is in the Modifications section (see below).

The T-80B main battle tank in the Artillery Museum of St. Petersburg, 06.05.2007 (photo "One half 3544", http://ru.wikipedia.org)

T-80BV tanks of the 22nd Army, Moscow region, winter 2009 (http://militaryphotos.net).

T-80BV tanks. Educational and methodological gathering of the Western Military District, 138th rifle brigade, Leningrad region. May 2011 (photo - Alexander Pak, http://sashapak.livejournal.com).

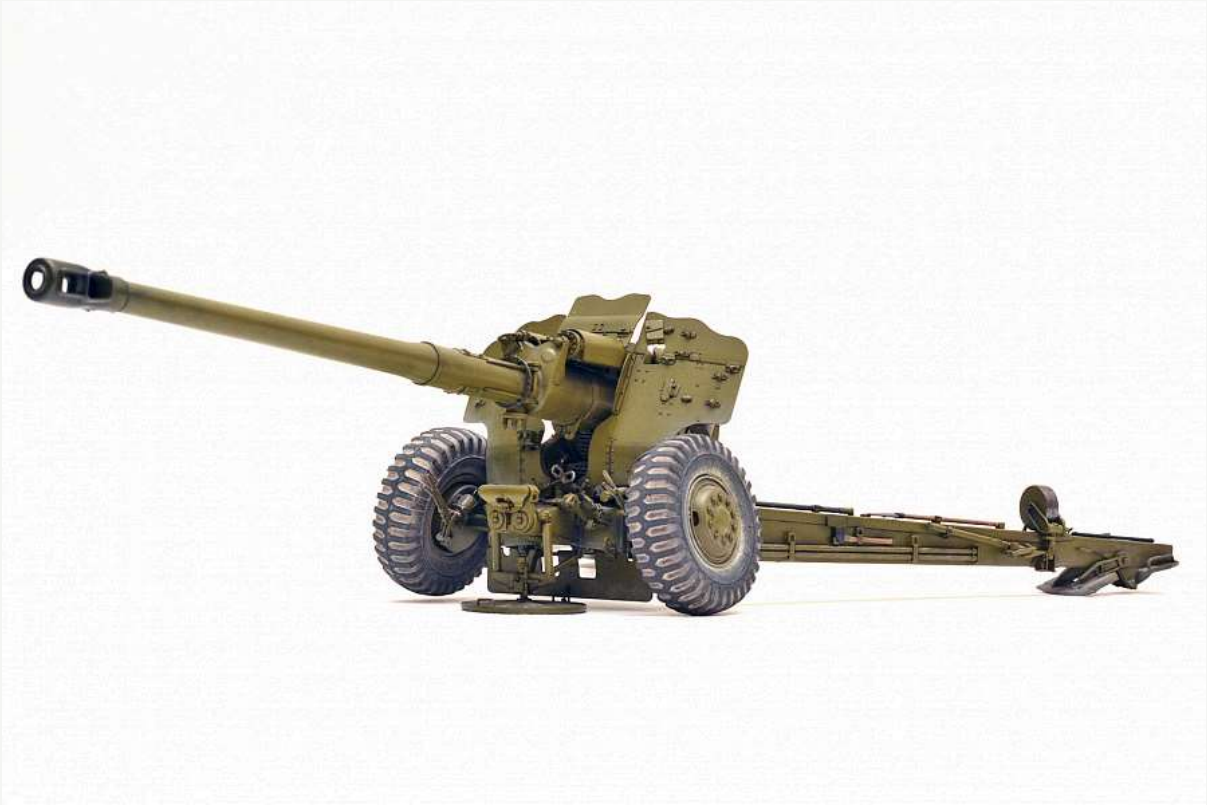
Author: DIMMI Created: 22.02.2010 00:30:30 Comments: 19 READ THE FULL ARTICLE

122mm D-74 gun

DATA AS OF 2022 (standard replenishment)
D-74
★★★★

122 mm corps gun. The gun was developed by OKB-9 under the supervision of Petrov to replace the 122 mm A-19 gun (model 1931/1937). Serial production of the gun began in 1954-1955. According to Western data, the gun was accepted into service in 1955 and began to enter service with the Soviet Army.

The gun is designed to suppress and destroy enemy manpower, mortars, artillery and other fire weapons, to destroy field and long-term defensive structures, to suppress the rear and command and control bodies of enemy troops.



Model of the 122 mm D-74 hull gun, combat position (source)

Author: DIMMI Created: 22.06.2012 19:44:15 Comments: 1 READ THE FULL ARTICLE

UR-500 / 8K82 Proton - SL-9

DATA AS OF 2022 (standard replenishment)
K8K82 complex, UR-500 / 8K82 Proton missile - SL-9
★★★★

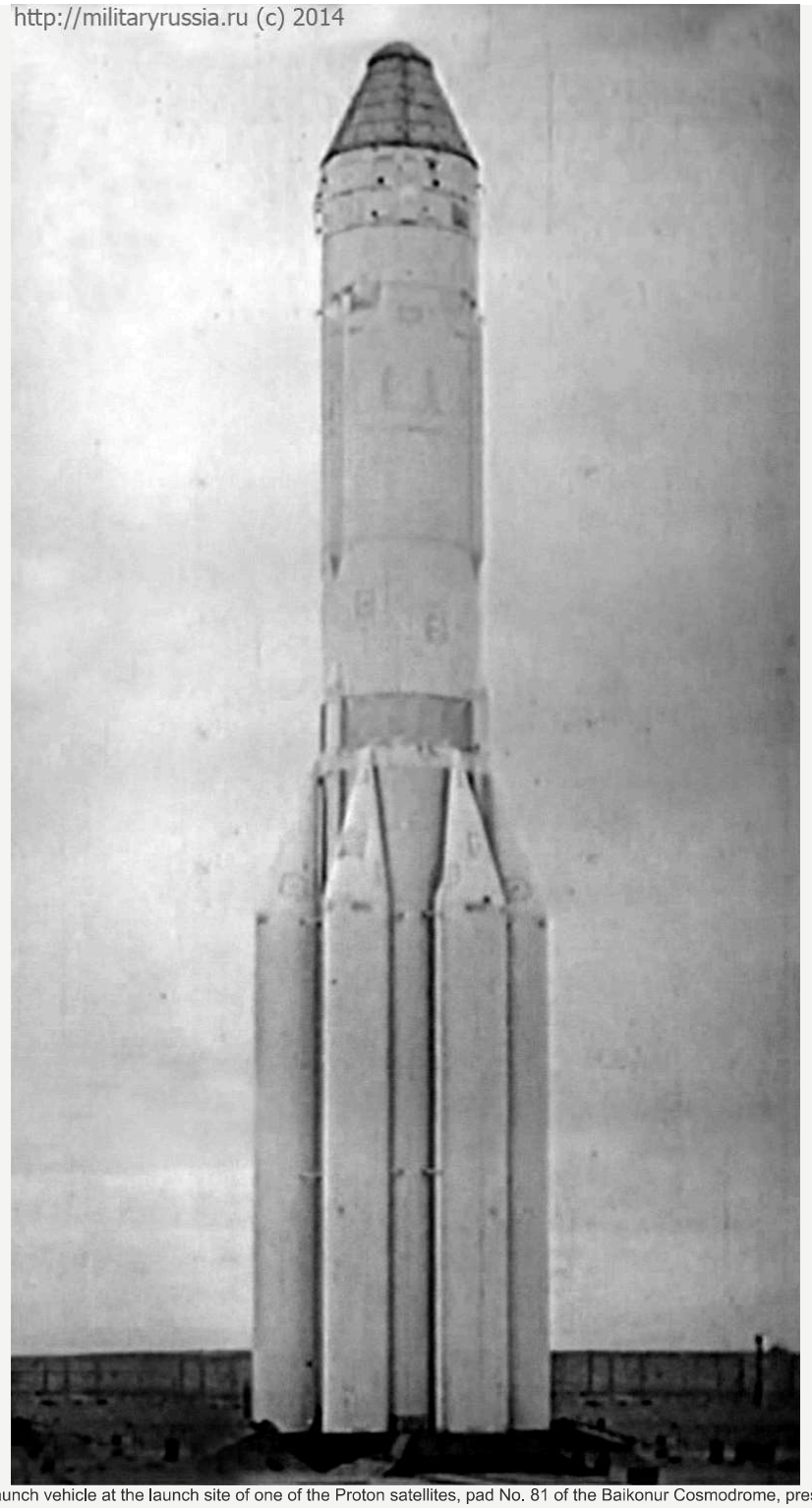
Heavy-class intercontinental ballistic missile (ICBM). Development of the missile was started by OKB-52 of General Designer V.N.Chelomey on its own initiative in the spring of 1961. The official decision to develop the missile was made by Resolution of the Central Committee of the CPSU and the Council of Ministers of the USSR No. 409-183 of April 24, 1962. The tactical and technical requirements for the missile were adopted by the USSR Ministry of Defense by decision No. T726 of January 17, 1963. The chief leading designer of the UR-500 project at the first stage was P.A.Ivensen. Since 1962, the chief designer of the project is Yu.N.Trufanov. At the design stage, D.A. Polukhin (later appointed chief leading designer of the project), V.K. Karrask, G.D. Dermichev, V.A. Vyrodov, E.T. Radchenko, E.S. Kulaga, N.N. Mirkin, Yu.P. Kolosnov, V.F. Gusev and A.T. Tarasov took direct part in determining the technical parameters of the rocket.

Development of the rocket project began in the second half of 1961 on the initiative of V. Chelomey. Development of the rocket project was specified in three versions:
- heavy-class intercontinental ballistic missile;
- global rocket;
- launch vehicle for spacecraft weighing 12-13 tons;

At the initial stage of development, the project went through several significantly different versions of the rocket layout (see Modifications). As a result, in January 1962, the scheme with a package layout of the first stage was selected for revision. On April 24, 1962, the USSR Council of Ministers issued a Resolution (see above) on the development of the UR-500 missile with the final layout of the first stage. In May 1962, a preliminary design for the UR-500 missile was released based on this version. The preliminary design for the UR-500 missile was completed in 1963. The design of the UR-500 as a whole was completed by the end of 1964.

In 1962, NII-1011 (now VNIITF) began developing a munition with a 100-megaton charge developed by KB-11 (VNIIEF) for an ICBM based on the UR-500 (source). The development was brought to the preliminary design and assembly of a design model. In 1963, NII-1011 also developed munitions for unguided and guided orbital modifications of ICBMs. In the mid-1960s, work on heavy ICBMs in OKB-52 and related organizations developing warheads ceased.

After October 1964, in connection with the dismissal of N.S. Khrushchev, the UR-500 project was revised and development of the combat version of the missile was terminated. Only the launch vehicle for spacecraft remained in development.



The UR-500/8K82 launch vehicle at the launch site of one of the Proton satellites, pad No. 81 of the Baikonur Cosmodrome, presumably 16.07.1965 (reconstruction of a photo based on newsreel footage, http://militaryrussia.ru , April 2014).

Author: DIMMI Created: 03.04.2014 00:54:29 Comments: 18 READ THE FULL ARTICLE

1 2 3 4 5 6 ... 14 15 16